

*Fig. 13.* Systematic arrangement of the nervous system: *a*, cephalic ganglion; *b*, ventral ganglion; *c*, anterior branch of nerves or pharyngeal commissure; *d*, posterior branch; *e*, anterior cephalic nerves, with their ganglionic protuberances; *f*, *g*, posterior cephalic nerves describing a loop; *h*, optic nerves with their ganglions *k*.

*Fig. 14.* The eye, optic nerve and its ganglion, magnified ninety-five diameters: *a*, optic nerve; *b*, ganglion; *c*, eye; *d*, cornea or crystalline lens, forming a rounded prominence; *e*, fibrils visible toward the circumference of the eye; *f*, excavation in the skin of the head, in the interior of which the eye and the ganglion are inclosed.

XXXII.—*Descriptions of new or imperfectly described Diurnal Lepidoptera.* By EDWARD DOUBLEDAY, Esq., Assistant in the Zoological Department of the British Museum, F.L.S. &c.

[Continued from p. 236.]

Fam. PAPILIONIDÆ.

Genus PAPILIO.

THE description of *P. Evan* given in the last Number had scarcely passed through the press, when the Museum received a large and valuable collection of insects from Sylhet, amongst which were specimens of this species, up to that time unique in Mr. Harrington's cabinet. One of these fortunately is a female, and I am therefore able to point out the characters in which this sex differs from the other. In size it is much larger, the expansion of the wings being full an inch and a half greater; the anterior wings are less falcate, their colour above much paler; the base is not shaded with fuscous, the spot on the disco-cellular nervule is more distinct, there are two or three irregular dark spots in the cell, the dark border is narrower and not quite of so deep a colour, the light fulvous spots are more distinct; the posterior wings are paler, the dark margin much narrower, the inner row of spots very distinct, the indentations and the tail pale fulvous, and the under surface is much paler.

In addition to some species described by Mr. Westwood not previously in the cabinets of the Museum, this collection contained a new species remarkable for the form of its posterior wings, and connecting *P. Protenor* and *Rhetenor* with *P. Ganesa*, *Bianor* and the other species of that group which have some of the nervules covered with down towards the extremities. For this species I propose the name of *P. Elephenor*, under which it will be found described below.

Whilst on the subject of the Indian *Papiliones*, I may remark upon an error in regard to three Indian species into which Erichson, in his Report on Entomology for 1842, has fallen. I have not troubled myself to do this so long as the report remained in

its original German, but now that it has been translated and widely circulated by the Ray Society, it becomes almost imperative on me to do so, and to put our English naturalists on their guard against this and numerous—I am sorry to say very numerous—similar errors, in this and other reports in the same volume. I am the more surprised at the error in the case of these species, as I believe the information relative to them was given to Erichson by an English entomologist who well knew their distinction.

Erichson states that *P. Ganesa* is synonymous with *P. Arcturus*, *P. Polyuctes* with *P. Bootes*, and *P. Xenocles* with *P. Pollux*. Had he ever read the descriptions, he could not have fallen into this error.

*P. Ganesa* is in both sexes destitute of the splendid blue patch on the posterior wings so conspicuous in *P. Arcturus*, and is far more nearly allied to *P. Paris* than to that species, but differs from it in many points besides the downy nervures of the anterior wings in the males.

*P. Polyuctes* is much nearer to *P. Philoxenus* than to *P. Bootes*, and may possibly be only a variety of the former, though I think its characters are too clearly marked for this to be the case. Of the four species in this singular group, *P. Polyuctes* has the posterior wings by far the narrowest, *P. Bootes* by far the widest. *P. Bootes* has a large red patch at the base of the wings below, *P. Polyuctes* has not; *P. Bootes* has the white spots on the disc of the posterior wings of a totally different form, and in a different position to *P. Polyuctes*.

*P. Xenocles* being almost a white insect, *P. Pollux* almost entirely brown; *P. Pollux* extending in extent of wing little less than double the expanse of *P. Xenocles*, cannot very easily be confounded. The species nearest to *P. Xenocles* is *P. Macareus*; but this is a darker insect, the dark markings extending over a wider space, the light colour not being nearly so white; it also wants the orange spot at the anal angle of the posterior wings.

I am convinced that Erichson cannot have seen the descriptions of these species, and has been misled by erroneous information from England. Other mistakes in his report I shall hereafter point out.

*P. Elephenor.* P. alis anticis elongatis, supra nigris, viridi irroratis, nervulis tribus pubescentibus, subtus pallidis nigro lineatis, posticis ovatis elongatis, angustatis, dentatis, nigris viridi irroratis, antice cærulescenti nitentibus, lunula anali rufa, subtus nigro-cæruleis, lunulis marginalibus rufis, cæruleo irroratis (♂). Exp. alar. 5 unc. 3 lin. vel 132 millim.

*Hab.* Sylhet.

Anterior wings elongate, triangular, the outer margin about two-thirds the length of the anterior, the inner bearing the same

proportion to the outer margin; black, irrorated with green at the base of the discoidal cell and on each side of the nervules; the radial nervure, the fold between that and the first median nervule, the first and second median nervules clothed with long hairs, as in *P. Bianor*, &c. Posterior wings elongate-ovate, the abdominal margin nearly straight, the outer quadridentate, black, irrorated with green, the anterior margin shaded with blue as in *P. Bianor*; the anal angle marked with an ocellus incomplete towards the margin, the pupil jet-black, the iris purplish red, irrorated with light blue. Cilia of the inner margin and of the indentations pale. Below, the anterior wings are pale, more fuscous towards the apex, the nervures and nervules, four streaks in the cell, and a series of streaks between the nervules fuscous. Posterior wings fuscous black, with purplish reflections, the anal angle with a large rufous patch pupilled with black, irrorated with blue, surmounted by an intense black cloud, and connected with a large lunule of the same rufous colour, and also irrorated with blue; the outer angle has an imperfect black pupilled ocellus followed by three lunules, and in the interstice of the second and third median nervule a cloud of scattered scales of the same colours; the black ground-colour being more intense above all these markings.

Head buff, vertex and antennæ black.

Thorax black.

Abdomen pale, marked down the back with a black streak.

In the collection of the British Museum.

#### Fam. SATYRIDÆ.

#### Genus HÆTERA.

*H. Esmeralda.* H. alis omnibus hyalinis, pube tenuissima brunnea vestitis, posticis fusco-fimbriatis ocello magno ad angulum externum, punctis duobus marginalibus albis, plagaque læte ianthina in qua maculæ duæ chermesinæ. Exp. alar. 2 unc. 6 lin. vel 65 millim.  
*Hab.* Para.

All the wings diaphanous, the nervures and nervules brown, the whole wing covered with delicate downy hairs of the same colour, longest on the dilated portion of the costal nervure and the anterior part of the cell of the anterior wings, which are immaculate. Posterior wings with a slender brown margin externally, the outer angle with a large purplish black spot, surrounded by a yellowish and a brownish iris, and pupilled by a pure white spot placed beyond the centre; this ocellus followed by two pure white spots, beyond which, extending to the anal angle, is a large patch of the most beautiful ultramarine, in which are two slightly opalescent carmine spots. Below, the markings nearly as above, the ocellus with a few white scales be-

fore the pupil, the spot at the anal angle brown, marked with pale rose-colour in the place of the carmine of the upper surface.

Head dark brown, white posteriorly; antennæ pale brown; palpi white.

Thorax brown above, paler below; anterior legs white, posterior pale brown.

Abdomen brown, pale below.

In the collection of the British Museum. Presented by Mrs. J. P. F. Smith.

This beautiful species is closely allied to *H. Andromeda*, but is readily distinguished by its immaculate anterior wings and the brilliant blue patch of the posterior.

#### Genus ARGYROPHENGA.

Maxillæ rather long, slender.

Labial palpi long, porrect, divergent, the basal joint short, the second joint very long, both densely clothed with long hairs; third joint not quite so long as, and slenderer than, the second, densely clothed with hairs of moderate length.

Antennæ short, gradually tapering to a compressed blunt club.

Anterior wings rather elongate, subtriangular, anal angle rounded; the subcostal, median and radial nervules slightly dilated at the base, the first median nervule thrown off at the end of the cell. Posterior wings obovate.

This genus is closely allied to *Erebia*, and from Mr. Earl's account of its habits, they seem much to resemble those of the sub-alpine species of that genus. The elongate palpi and short antennæ give it at first sight the appearance of *Libythea*, but there does not appear to be any real affinity between them. The silvery markings below suffice alone to distinguish it from all the other *Satyridæ*, giving it a resemblance to the *Argynnidæ*.

*A. Antipodum.* A. alis omnibus fusco-brunneis, plaga, magna pone medium rufa, in qua in alis anticis ocellus niger albo bipupillatus, in posticis tres vel quatuor unipupillati, posticis subtus ochraceo-brunneis, vittis novem longitudinalibus argenteis (♂). Exp. alar. 2 unc. vel 50 millim.

*Hab.* Nova Zeelandia.

Anterior wings fuscous brown, the base and costa thickly sprinkled with paler scales and hairs, with a large fulvous patch beyond the cell, occupying the whole disc of the outer half of the wings, and in some specimens almost attaining the inner margin, in which, near the middle of its anterior margin, is a large black ocellus with two snow-white pupils. Posterior wings coloured as the anterior, the fulvous patch with a series near its outer margin of three or four black ocelli pupilled with snow-white. Below, the anterior wings are much paler at the base and along the

costa; the outer margin is ochraceous brown, bordered internally with black, externally with a bright silvery line, and marked towards the apex between the nervules with three or more silvery vittæ. Posterior wings ochraceous brown, margined externally by a silvery line; a vitta in the cell, commencing above it at the base of the subcostal nervure, a very slight one above the first subcostal nervure, a long slender one below it, followed by four very distinct ones in the interstices between the nervules, a longer one extending to the base between the median and radial nervures, and a similar one between the latter and the abdominal margin bright silvery white, all except the two first-mentioned connected with the marginal line. Cilia of the anterior wings rufescent, darkest towards the anal angle; of the posterior ochraceous brown.

Head brown; antennæ brown above, white below; palpi light brown.

Thorax clothed with long brown hair; legs very pale brown.

Abdomen black above, very pale brown below.

The female is smaller, much paler in colour; the outer margin of all the wings above, and of the anterior below, very pale brown; the apex of the anterior marked above with two silvery vittæ, their discoidal cell on both sides and that of the posterior above with a fulvous vitta.

In the collection of the British Museum, Mr. W. W. Saunders, &c.

The only specimens of this insect which I have seen were obtained by P. Earl, Esq., who discovered them on a plain in the southern island of New Zealand. The specific name was suggested to me by Dr. Boisduval, who agreed with me in the opinion that it was one of the most, if not the most, interesting species of the family yet known. At present it is the only one from New Zealand.

XXXIII.—*On the Genera Spirulina and Coleochæte.* By JOHN RALFS, Esq., M.R.C.S., Penzance\*.

[With a Plate.]

*SPIRULINA*, Turpin (Kütz.).

Filaments collected into a mucous film-like stratum, simple, spiral, oscillating, "inarticulate."—Kütz. *Phycologia Generalis*, p. 182.

*Spirulina* has its filaments interwoven into a thin stratum of

\* Read before the Botanical Society of Edinburgh, Dec. 12th, 1844, and Jan. 9th, 1845.